A. Problem Statement
Existing proxy-based authentication approaches have problems (e.g., non-binding, susceptible to theft and dictionary attacks, burden on end-users, re-use risk). Biometrics, which authenticate users by intrinsic biological traits, arise to address the drawbacks. However, the biometrics are irreplaceable once compromised and leak sensitive information about the human user behind it.

New requirements for Biometrics:
- Diversity: do not allow cross matching across databases.
- Revocability (Cancelability): compromised template is revocable.
- Security: hard to obtain the original biometrics from secured template.
- Performance: not be degraded compared to conventional system.

B. Technical Rational, New Model and Approach

We propose a simple yet effective mechanism “Biometric Capsule”. The proposed mechanism fuses biometrics of a user and a (physical) Reference Subject and extracts BC for authentication.

Preliminary Result and comparisons:

C. Features and Potential Applications
(a) Provable secure (b) Usable and identity-bearing: a biometric-binding identity, plus non-intrusive continuous authentication, provides traceability and mitigate liability. (c) Privacy preserving (d) Biometric cancelable (e) General applicable: working with existing biometric modules. (f) Interoperable: supports “one-click sign on” across multiple systems by using a distinct RS on each system. (g) Cost-effective and easy to use: transparent to end-users, no user training.

User-centric identity ecosystem: the new BC based model is promising in developing a highly resilient, privacy-preserving, revocable, interoperable, and efficient user-centric identity verification and protection ecosystem.

Active authentication system: the new BC based approach is encouraging in developing a provably secure, privacy-preserving, biometric active authentication system to support continuous and non-intrusive authentication.

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